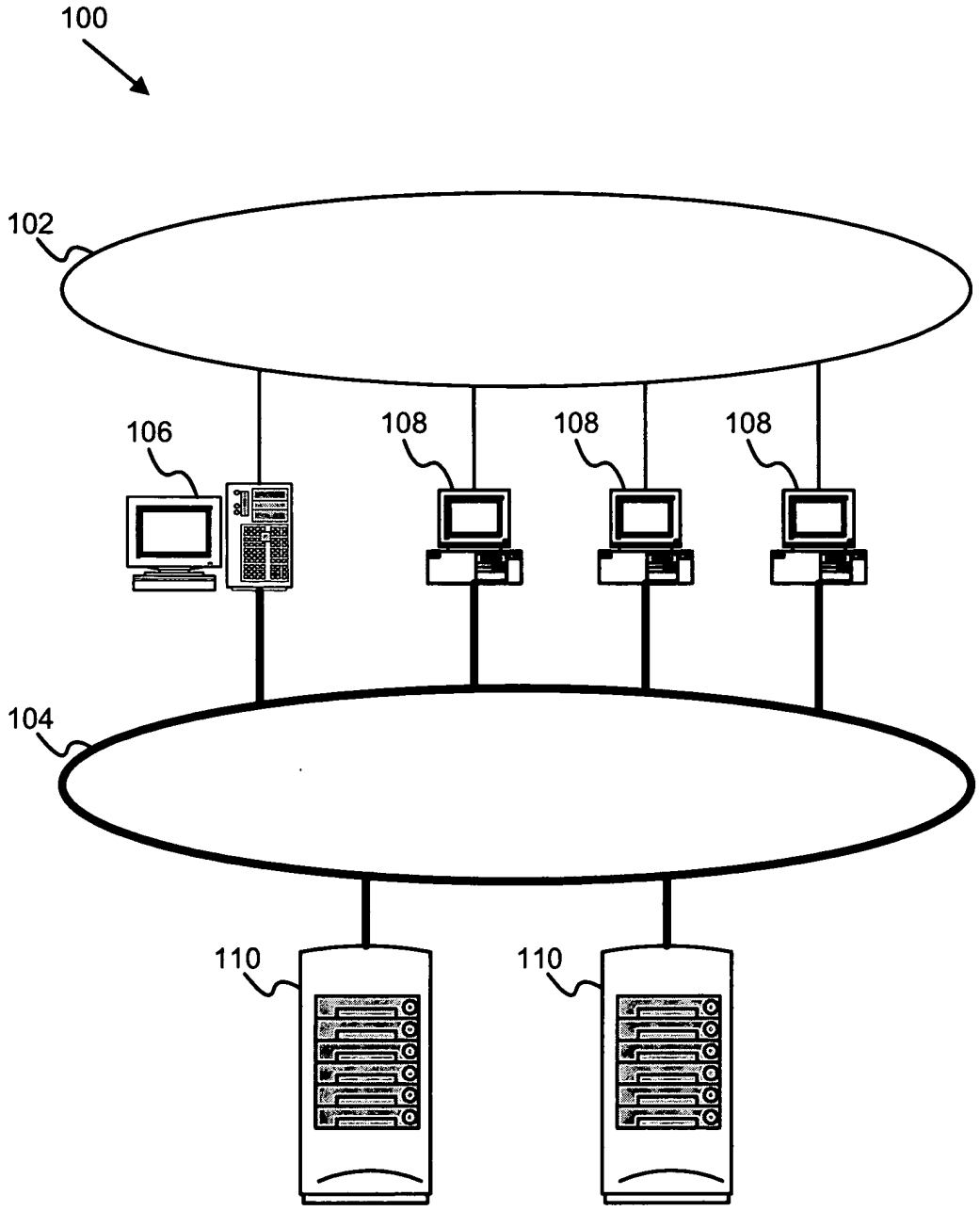

FIG. 1

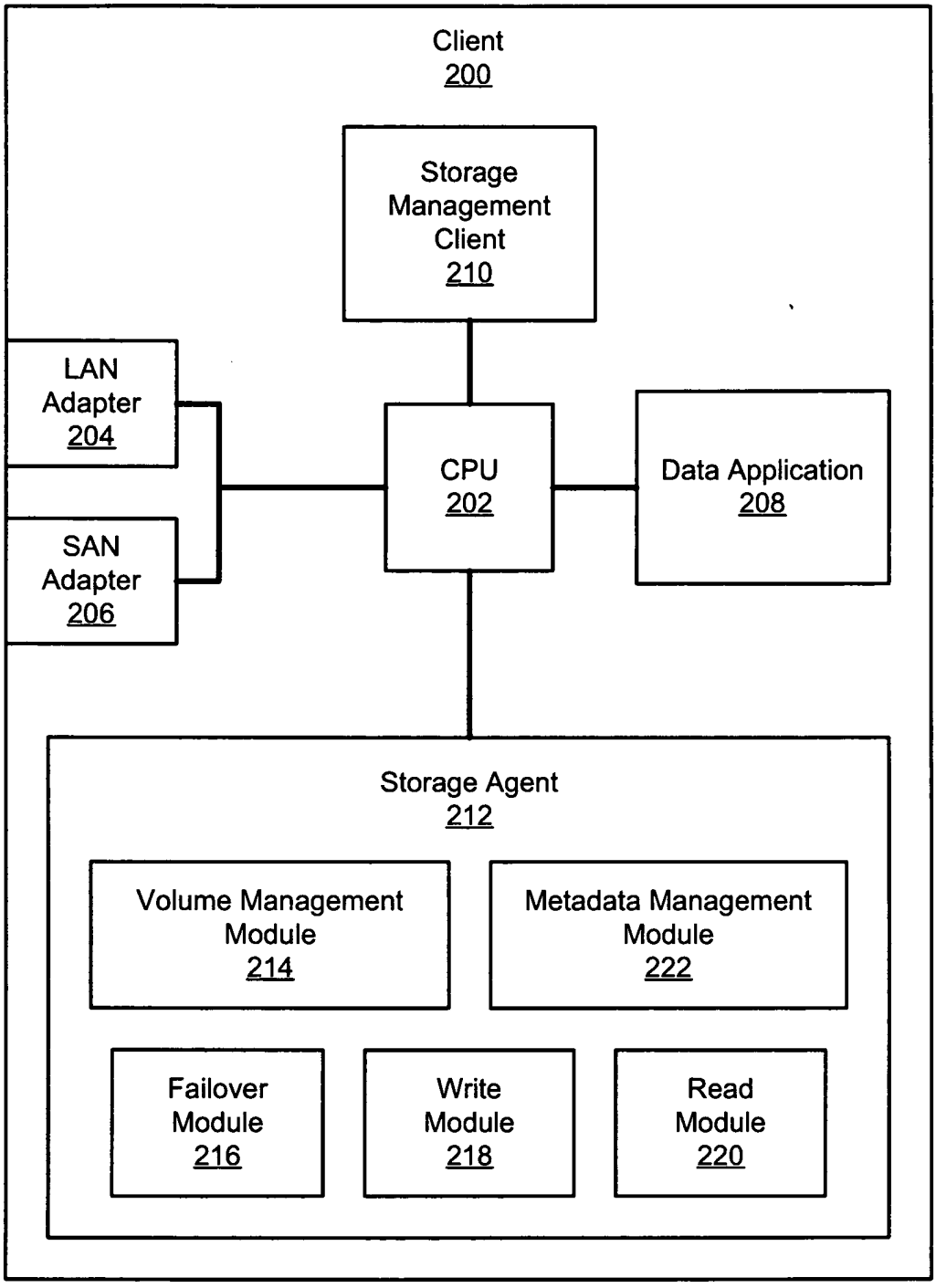
Client
200
Storage Management Client
210
LAN Adapter
204
SAN Adapter
206
CPU
202
Data Application
208
Storage Agent
212
Volume Management Module
214
Metadata Management Module
222
Failover Module
216
Write Module
218
Read Module
220

FIG. 2

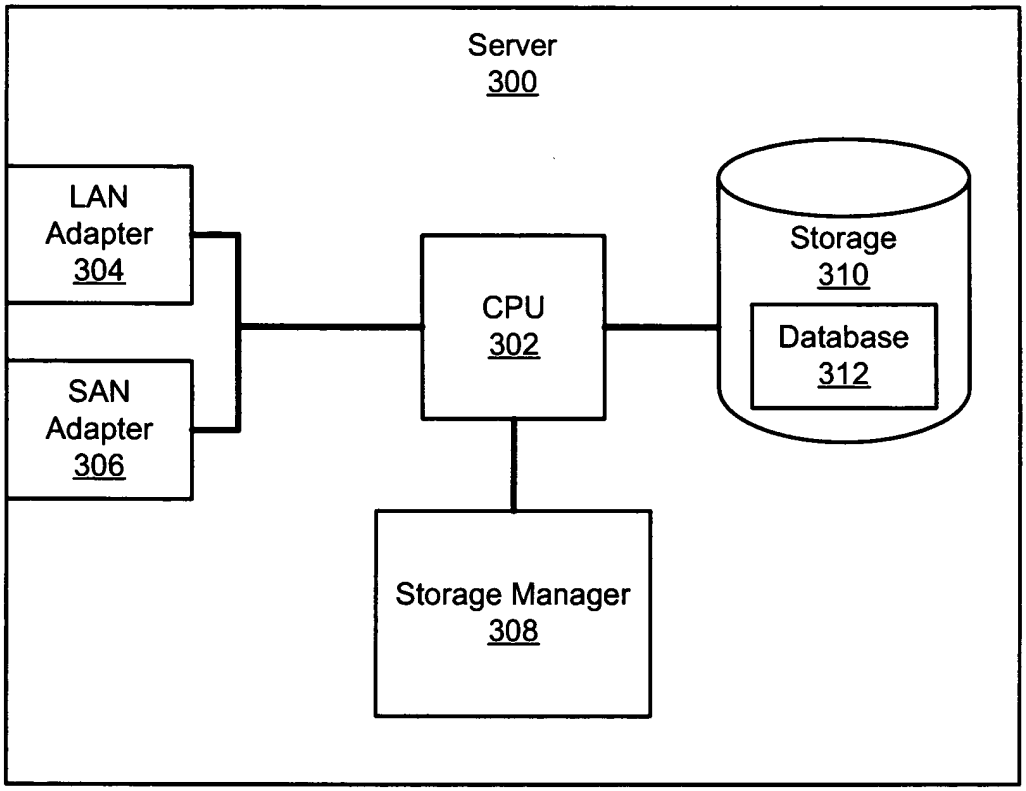
Server
300
LAN
Adapter
304
SAN
Adapter
306
CPU
302
Storage
310
Database
312
Storage Manager
308

FIG. 3

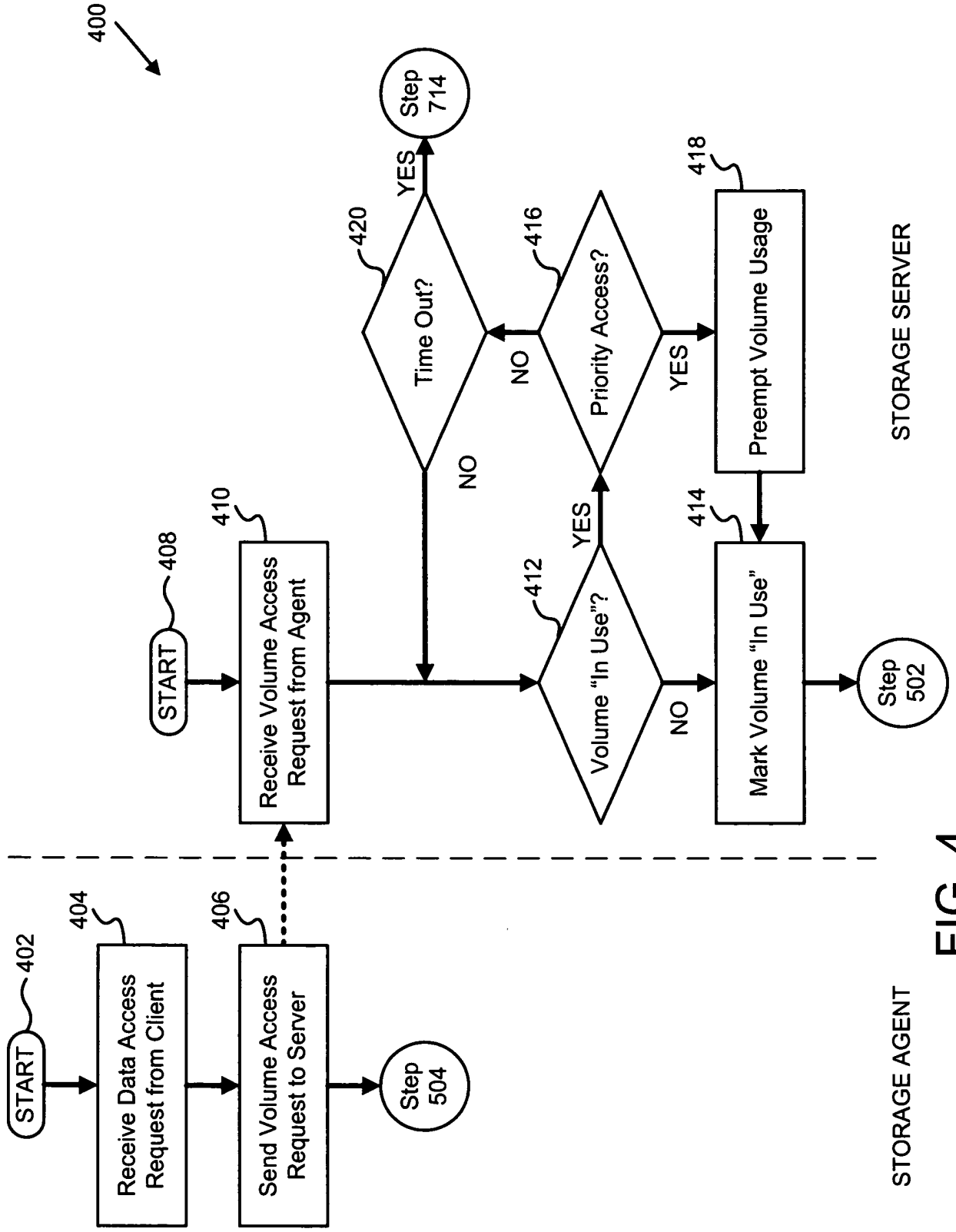
400
START
402
Receive Data Access Request from Client
404
Send Volume Access Request to Server
406
Step 504
STORAGE AGENT
START
408
Receive Volume Access Request from Agent
410
Volume "In Use"?
412
YES
NO
Mark Volume "In Use"
414
Step 502
Priority Access?
416
NO
YES
Preempt Volume Usage
418
Time Out?
420
YES
NO
Step 714
STORAGE SERVER

FIG. 4

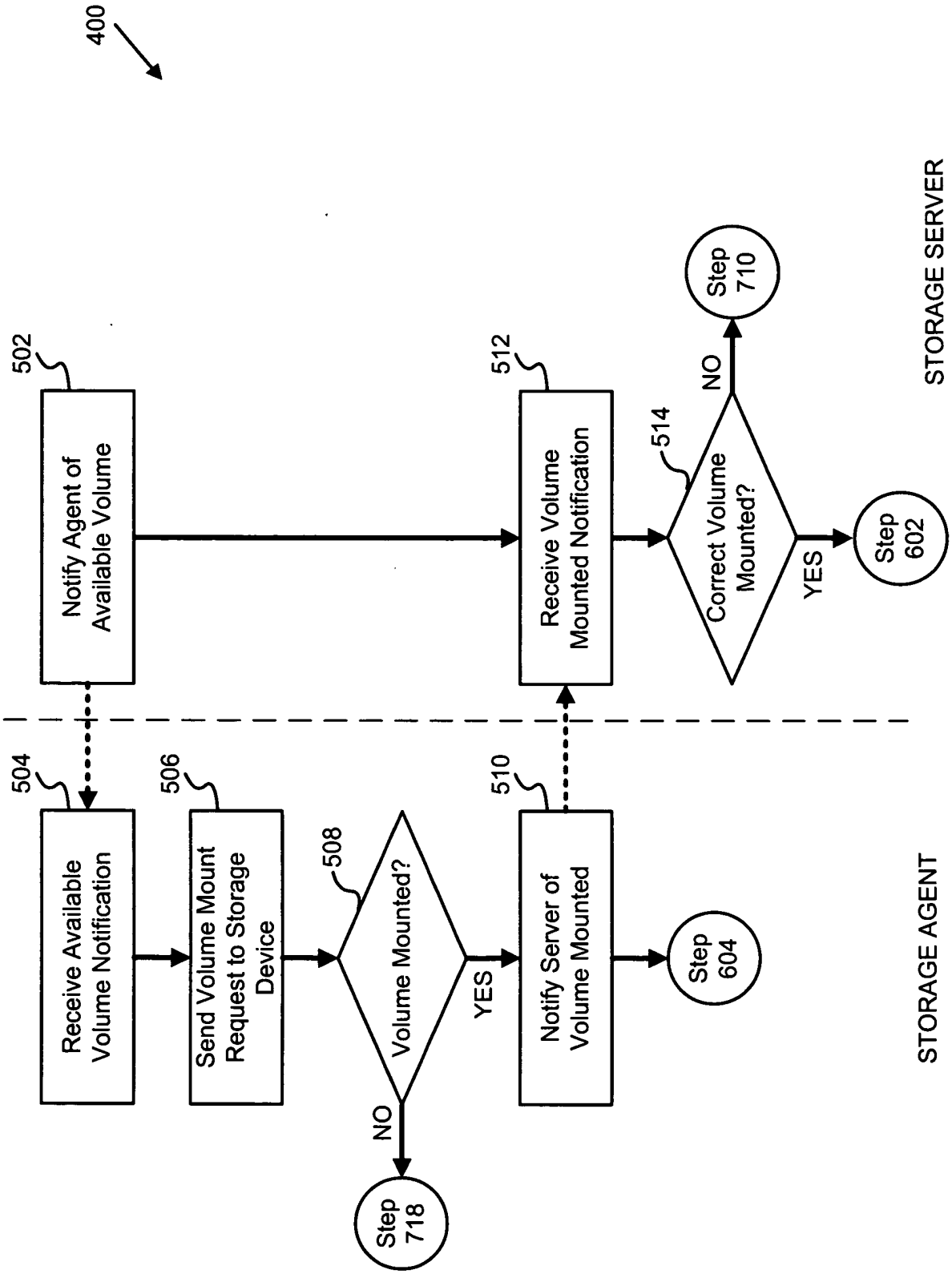
400
STORAGE SERVER
STORAGE AGENT
502
Notify Agent of Available Volume
512
Receive Volume Mounted Notification
514
Correct Volume Mounted?
NO
YES
Step 710
Step 602
504
Receive Available Volume Notification
506
Send Volume Mount Request to Storage Device
508
Volume Mounted?
NO
YES
510
Notify Server of Volume Mounted
Step 718
Step 604

FIG. 5

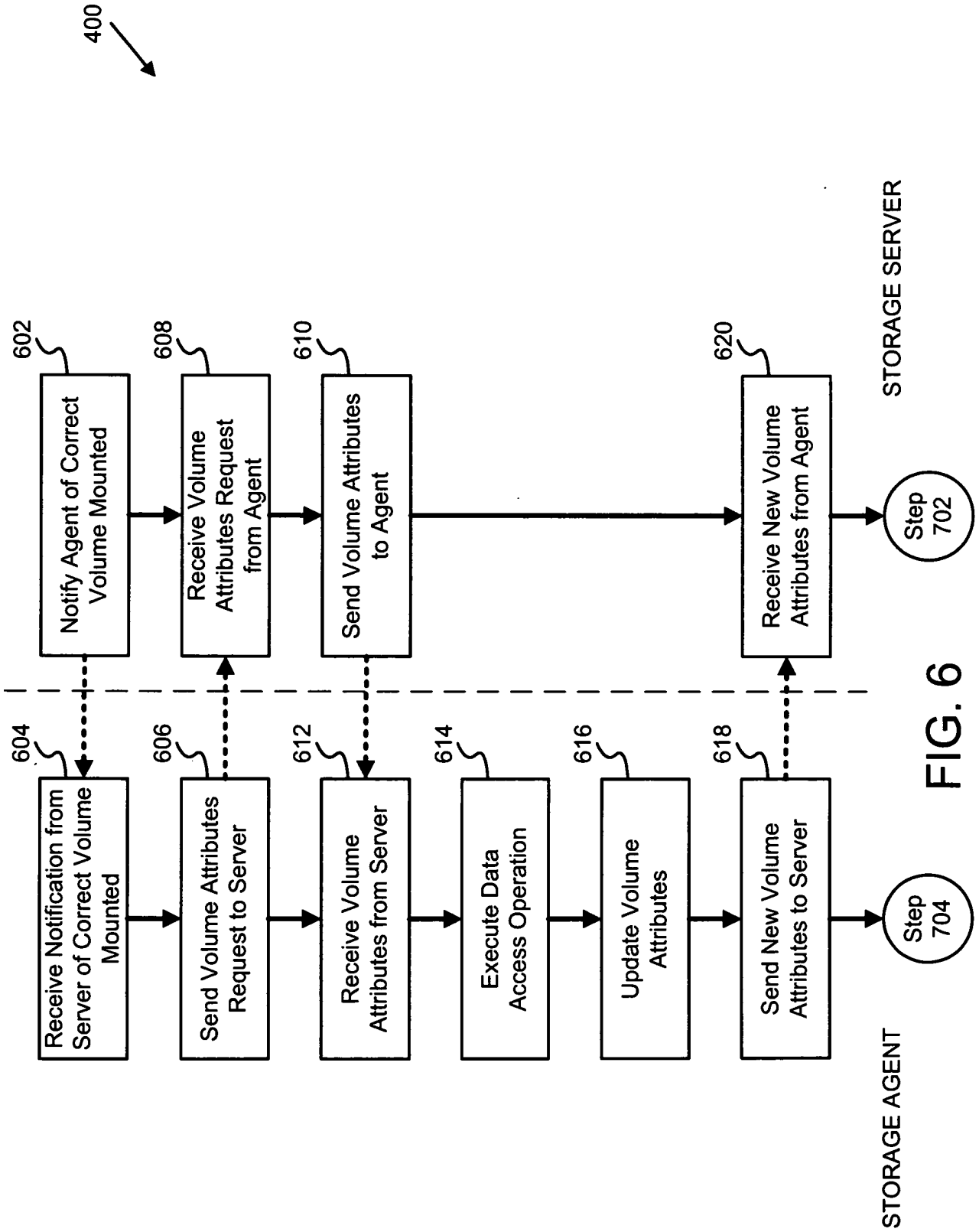
400
602
Notify Agent of Correct Volume Mounted
608
Receive Volume Attributes Request from Agent
610
Send Volume Attributes to Agent
620
Receive New Volume Attributes from Agent
STORAGE SERVER
Step 702
604
Receive Notification from Server of Correct Volume Mounted
606
Send Volume Attributes Request to Server
612
Receive Volume Attributes from Server
614
Execute Data Access Operation
616
Update Volume Attributes
618
Send New Volume Attributes to Server
Step 704
STORAGE AGENT

FIG. 6

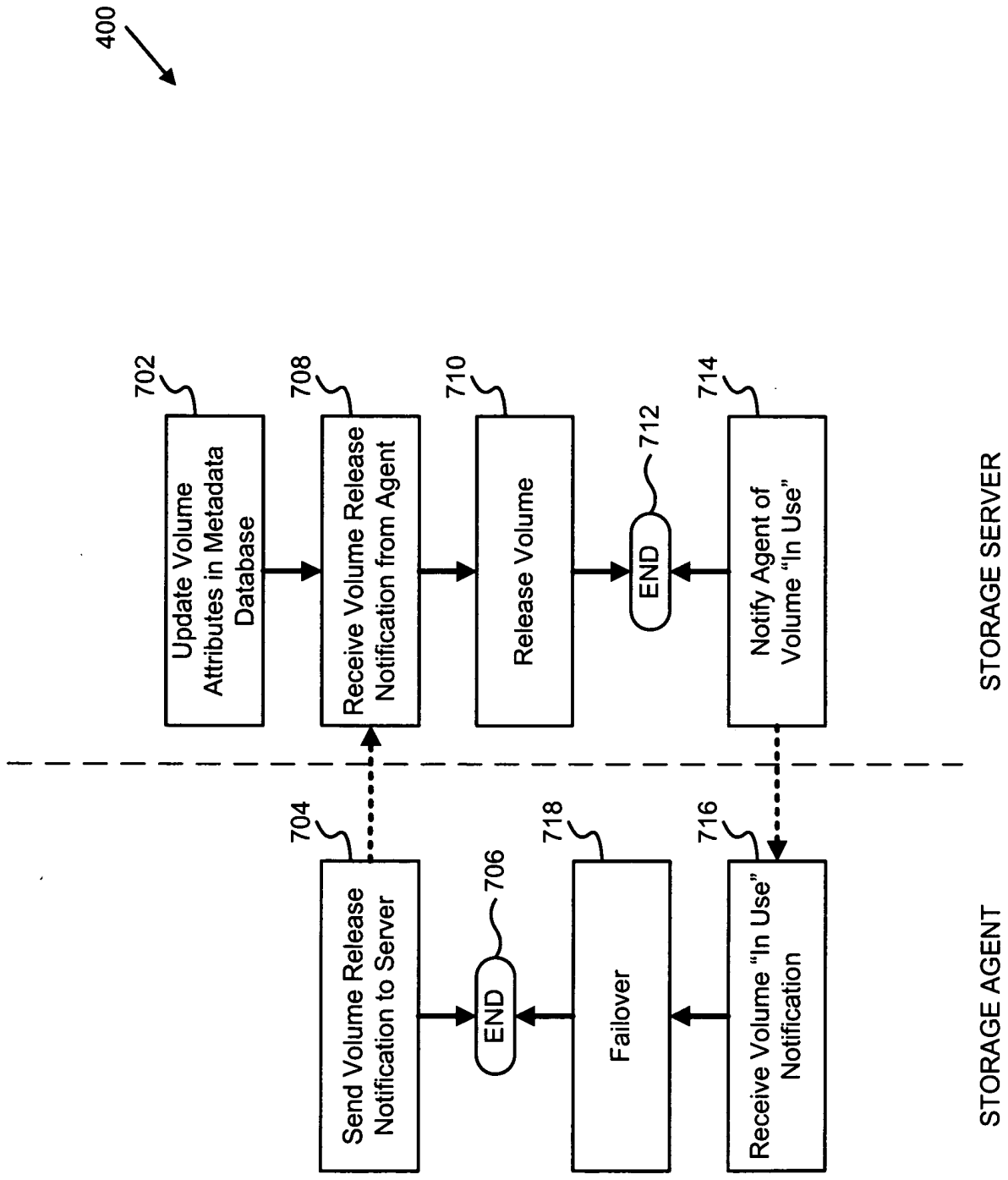
400
702
Update Volume Attributes in Metadata Database
708
Receive Volume Release Notification from Agent
710
Release Volume
712
END
714
Notify Agent of Volume "In Use"
STORAGE SERVER
704
Send Volume Release Notification to Server
706
END
718
Failover
716
Receive Volume "In Use" Notification
STORAGE AGENT

FIG. 7

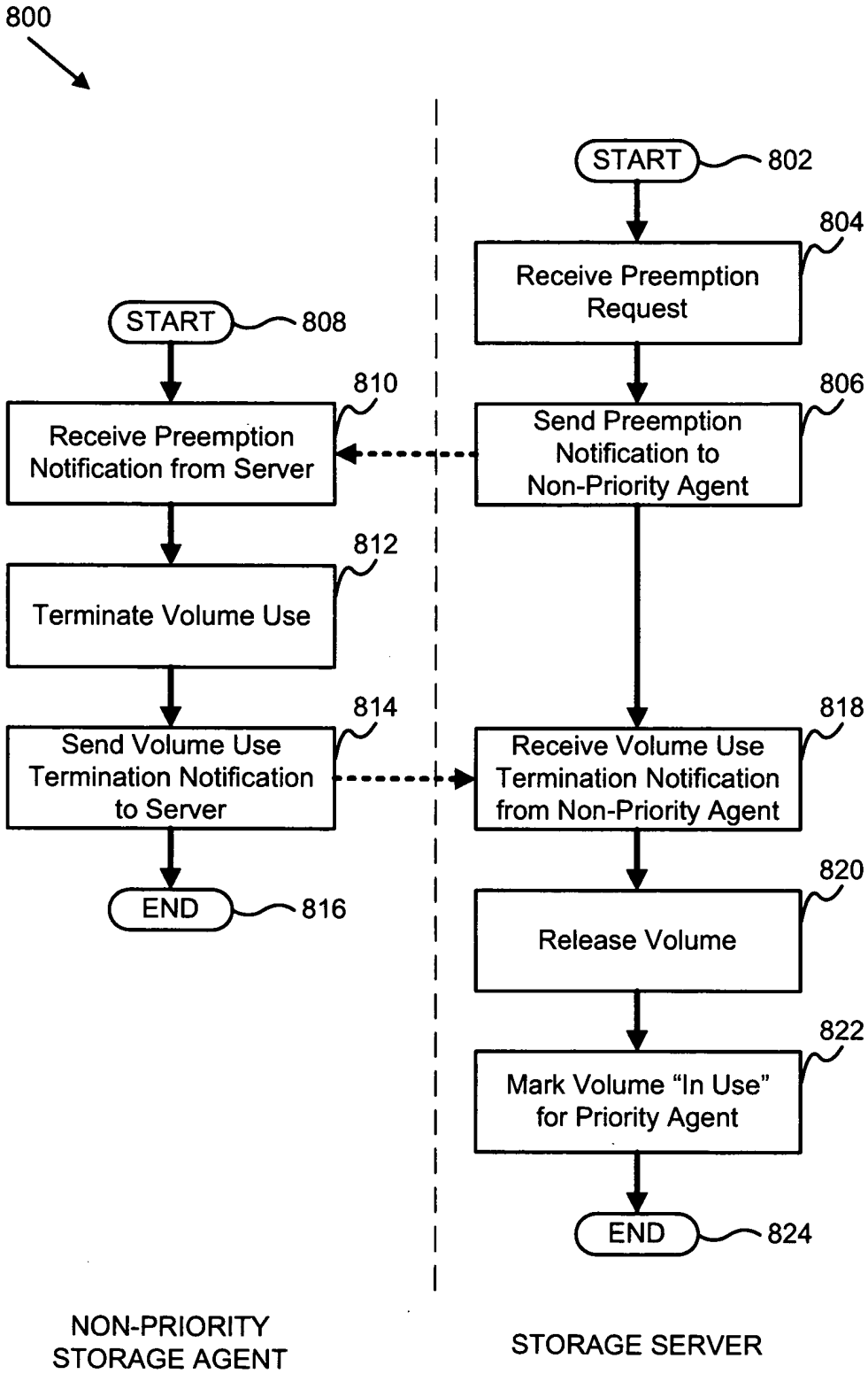
800
START
802
804
Receive Preemption Request
START
808
810
Receive Preemption Notification from Server
806
Send Preemption Notification to Non-Priority Agent
812
Terminate Volume Use
814
Send Volume Use Termination Notification to Server
818
Receive Volume Use Termination Notification from Non-Priority Agent
820
Release Volume
822
Mark Volume "In Use" for Priority Agent
END
816
END
824
NON-PRIORITY STORAGE AGENT
STORAGE SERVER

FIG. 8

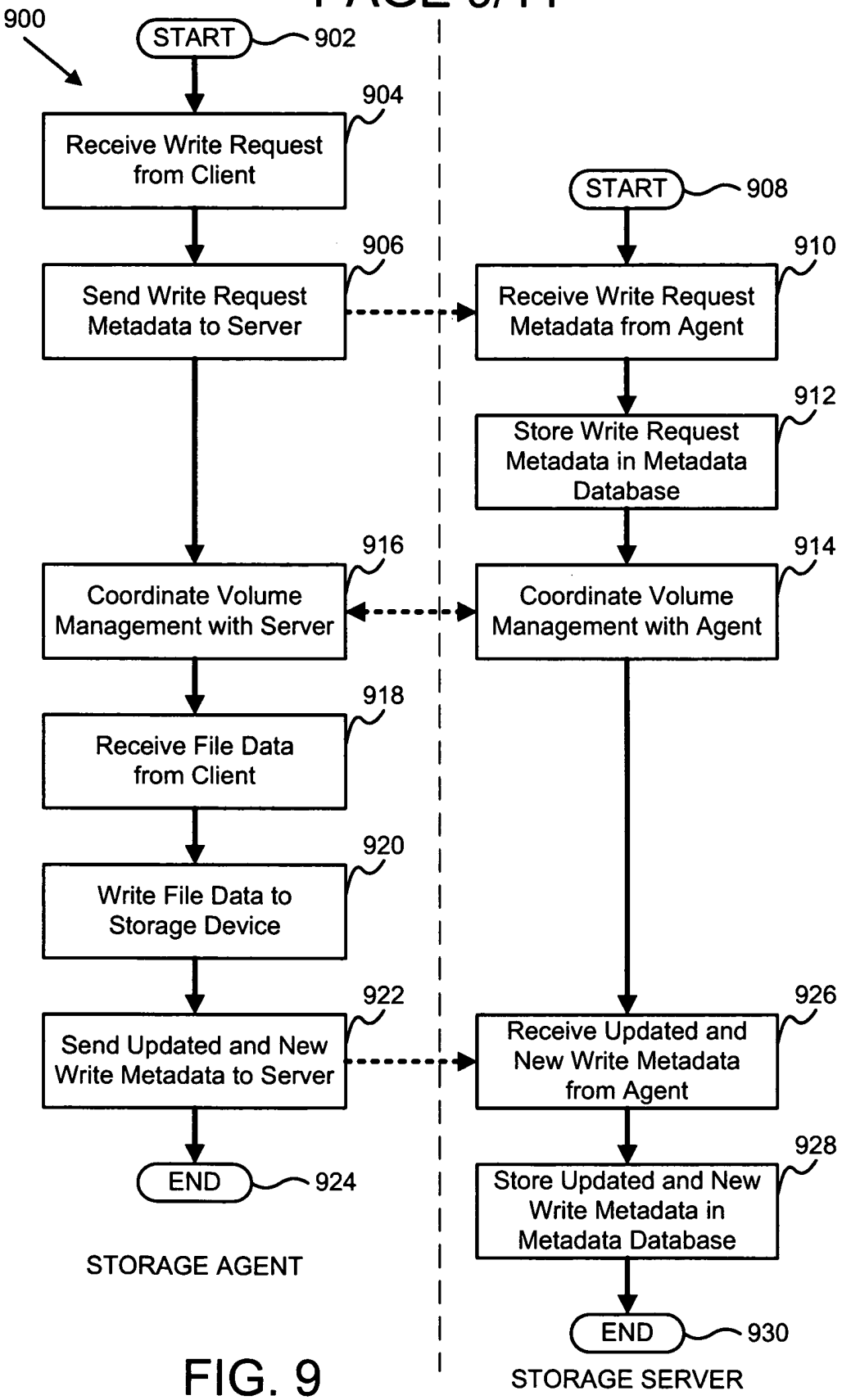
900
START
902
Receive Write Request from Client
904
Send Write Request Metadata to Server
906
Coordinate Volume Management with Server
916
Receive File Data from Client
918
Write File Data to Storage Device
920
Send Updated and New Write Metadata to Server
922
END
924
STORAGE AGENT
START
908
Receive Write Request Metadata from Agent
910
Store Write Request Metadata in Metadata Database
912
Coordinate Volume Management with Agent
914
Receive Updated and New Write Metadata from Agent
926
Store Updated and New Write Metadata in Metadata Database
928
END
930
STORAGE SERVER

FIG. 9

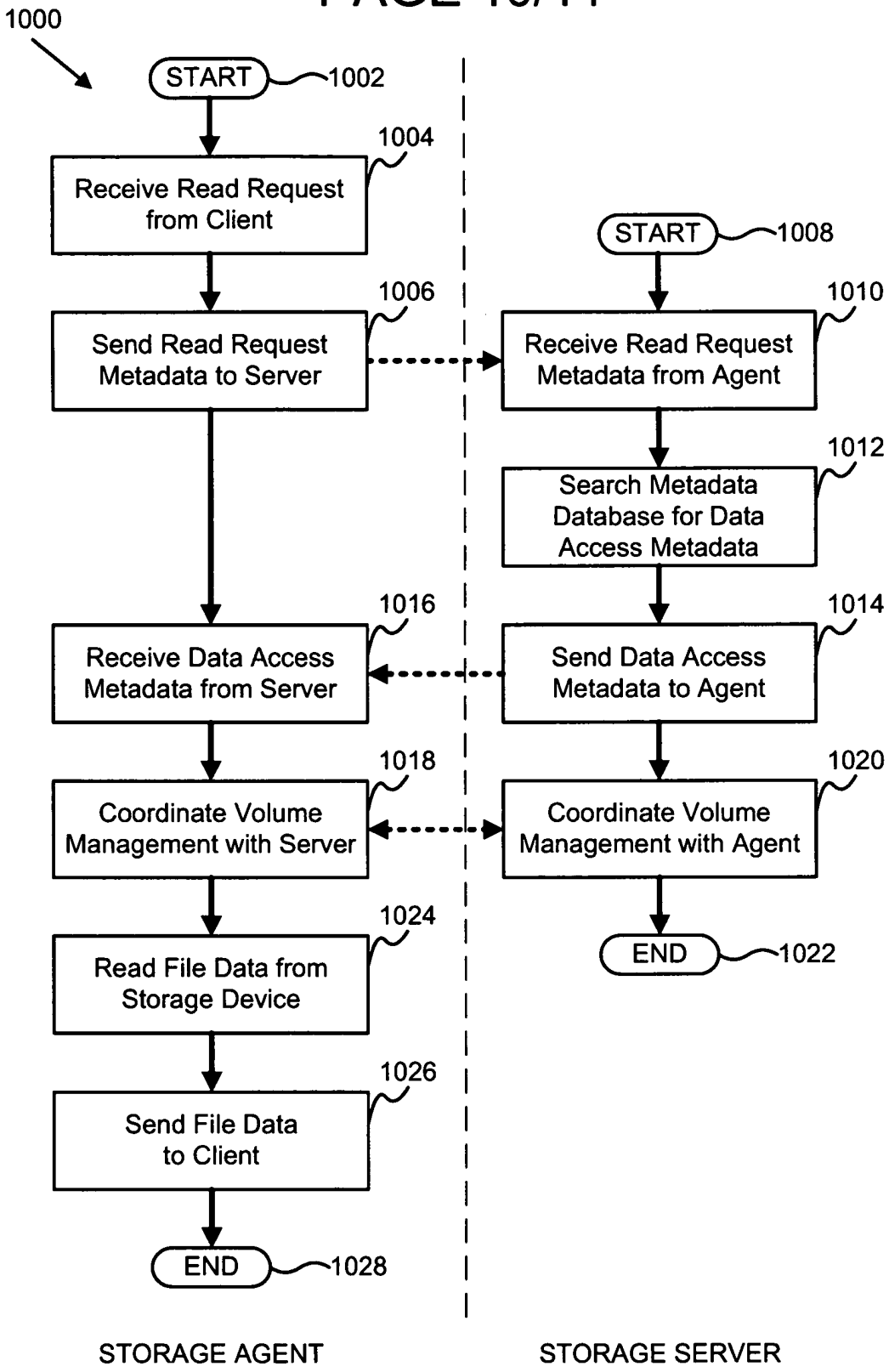
1000
START
1002
1004
Receive Read Request from Client
1006
Send Read Request Metadata to Server
1016
Receive Data Access Metadata from Server
1018
Coordinate Volume Management with Server
1024
Read File Data from Storage Device
1026
Send File Data to Client
END
1028
START
1008
1010
Receive Read Request Metadata from Agent
1012
Search Metadata Database for Data Access Metadata
1014
Send Data Access Metadata to Agent
1020
Coordinate Volume Management with Agent
END
1022
STORAGE AGENT
STORAGE SERVER

FIG. 10

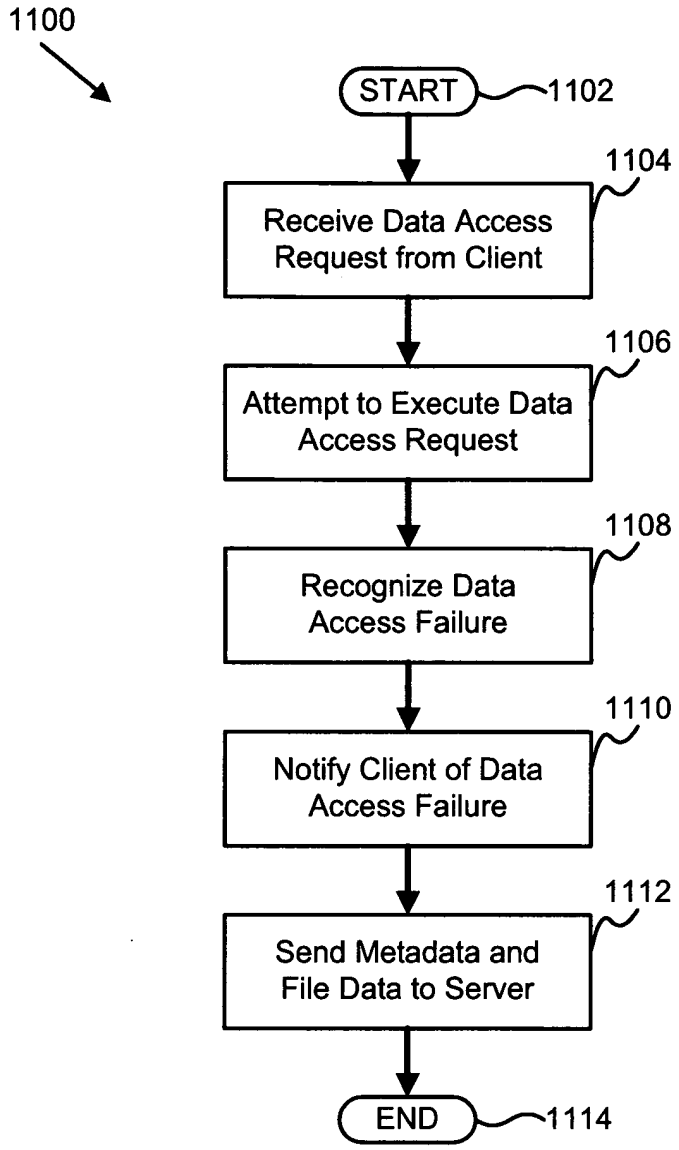
1100
START
1102
1104
Receive Data Access Request from Client
1106
Attempt to Execute Data Access Request
1108
Recognize Data Access Failure
1110
Notify Client of Data Access Failure
1112
Send Metadata and File Data to Server
END
1114
STORAGE AGENT

FIG. 11